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DOUGLAS-FIR TUSSOCK MOTH[1] MONITORING IN SOUTHERN IDAHO DURING 1982

by

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ABSTRACT

Surveys conducted in 1980 and 1981 indicated Douglas-fir tussock moth populations were increasing in the Owyhee Mountains of southwestern Idaho. This report presents results of a 1982 larval survey, an aerial detection survey, and an early detection survey using pheromone-baited traps.

INTRODUCTION

Douglas-fir tussock moth (DFTM) populations can rapidly increase and seriously defoliate host trees: Douglas-fir, grand fir, and subalpine fir. Because serious defoliation can occur in 1 to 2 years, survey methods have been developed to monitor populations quickly and accurately (Daterman et al. 1979, Mason 1979), thus giving land managers needed time to consider management alternatives. Since DFTM is difficult to detect between outbreaks, early detection surveys are accomplished using pheromone-baited sticky traps. The number of moths recovered from the traps provides a relative estimate of current and anticipated DFTM populations and, thus, the potential for tree defoliation. Should populations attain outbreak levels, aerial detection surveys are used to delineate defoliation. These methods have been routinely used in southern Idaho since 1979 in areas historically harboring DFTM populations.

Since surveys in 1980 and 1981 indicated that DFTM populations were increasing in the Owyhee Mountains of southwestern Idaho (Thier 1982), a larval survey was conducted in the Owyhee Mountains in 1982. Also, in 1982

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the early detection survey was expanded to additional areas in south-central Idaho, and DFTM defoliation was delineated during the annual aerial detection survey.

METHODS

Larval Survey

In the spring of 1982 I employed Mason's (1979) lower crown sequential sampling techniques to survey and categorize larval DFTM populations at Mill Creek and Dewey Peak in the Owyhee Mountains (fig. 1). These two areas had averaged over 25 adult moths per trap during the 1981 early detection survey. Additionally, in an effort to gather research data, Daterman[3] requested that five larval sample points be established in and around 1981 early detection survey plots where DFTM populations were expanding (Thier 1982).

Early Detection Survey

During late summer and fall of 1982, I conducted a DFTM early detection survey employing pheromone-baited sticky traps at 19 locations on the Boise, Payette, Salmon, Sawtooth National Forests, and adjacent State of Idaho lands (fig. 2). I chose locations where DFTM has been recovered during previous early detection surveys (Ollieu 1978, Thier 1982) or areas suggested by land managers. Using the procedures outlined by Daterman et al. (1979), pheromone-baited traps, obtained from the USDA Forest Service Methods Application Group, were placed at each location between August 16 and 25 and retrieved between October 25 and November 11. Captured moths were identified and the average number of moths per trap computed. Data were then interpreted according to Daterman et al. (1979).

Aerial Detection Survey

Tree defoliation by DFTM was mapped during the annual aerial detection survey conducted during August 1982.

RESULTS AND DISCUSSION

Larval Survey

Mason (1979) defined DFTM larval densities which are used to describe larval population levels and results of larval surveys. Densities were defined as low, suboutbreak, and outbreak levels. At the low level, larvae are uncommon and there is no risk of an outbreak for at least 2 years. At the suboutbreak level, larvae are common and the DFTM population has the potential to attain outbreak levels in the next generation. Lastly, at the outbreak level, larvae are abundant and are causing visible defoliation.

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[3] Letter dated April 26, 1982, from G. D. Daterman, Pacific Northwest Forest and Range Experiment Station, Forestry Sciences Laboratory, Corvallis, Oregon.

At Dewey Peak the larval population was categorized as being at a suboutbreak level; defoliation could be expected in 1983. However, visible defoliation was observed in the area (fig. 1) suggesting that more extensive sampling was needed.

At Mill Creek, the DFTM population was categorized as being at a low level. Although this categorization was accurate for the Mill Creek site, defoliation was noted in nearby areas (fig. 1). This supports the earlier suggestion that sampling should be more extensive.

According to various conditions reports (Moyer 1976, Parker 1973, Parker 1971, Parker et al. 1972, Forest Pest Management 1981, Forest Pest Management in press) Douglas-fir in the Owyhee Mountains has experienced defoliation every 3 to 5 years. Defoliation has persisted for 2 to 4 years before the DFTM populations succumb to parasites and predators, most notably, a neucleopolyhedrosis virus. Based on these historic trends, defoliation will probably be evident and may even increase in 1983.

Early Detection Survey

Thirteen of the 19 early detection survey sites contained DFTM populations (table 1). An average recovery of 25 or more moths per trap at a site indicates that a population may cause visible defoliation within the next two summers (Daterman et al. 1979). At only four sites: Adams Creek, East Fork Brownlee Creek, Fourbit Creek, and Olive Creek, all on the Payette National Forest, did moth catches exceed the indicative threshold of 25 moths per trap. Based on these results, defoliation is possible in these areas within the next 2 years. These data are my first indication of a resident DFTM population at these sites, and further assessments are needed.

Even though all other early detection survey sites had average moth numbers well below 25, certain trends are worth noting. More moths were trapped in 1982 than in 1981 at Skunk Creek, Brown's Pond, and Virginia Gulch, but the upward trend at Little Water Gulch seems more significant (table 1). Upward trends of this nature may indicate an increasing DFTM population.

Where the early detection survey did not result in average catches equal to or greater than 25 moths per trap (table 1)--all sites on the Boise, Salmon and Sawtooth National Forests and State of Idaho lands--DFTM populations will not cause noticeable defoliation in 1983.

Results from early detection surveys have correctly indicated increasing DFTM population changes but do not necessarily accurately locate the infestation outbreak area. Survey traps effectively monitor DFTM populations within a 1-mile radius of the survey site (Daterman pers. comm.); therefore, extensive follow-up larval surveys are necessary to accurately locate the DFTM population should management actions be desired.

Aerial Detection Survey

Defoliation of Douglas-fir, as noted from low-flying aircraft, is detailed in figure 1. Approximately 4,000 acres of defoliation, all confined to the Owyhee Mountains, was noted in 1982 (Forest Pest Management, in press). Approximately 1,700 acres were categorized as light defoliation, 1,700 acres as moderate defoliation, and 600 acres as heavy defoliation.

RECOMMENDATIONS

I recommend that 1983 larval surveys be conducted around the 1982 early detection survey sites--Adams Creek, East Fork Brownlee Creek, Fourbit Creek, and Olive Creek--on the Payette National Forests. Evaluation will help locate and quantify the resident DFTM populations in and around these sites to identify potential outbreak areas. Further quantification will provide more information about the trend of these infestations and give land managers the facts needed to consider management alternatives.

Elsewhere, aerial detection surveys and early detection surveys will be continued in 1983. These efforts will complement the DFTM-monitoring efforts.

Based on the historical infestation trends and remoteness of the defoliated stands of timber in the Owyhee Mountains, suppression is not warranted. Further identification and quantification of DFTM populations in the Owyhee Mountains is possible if research needs exist.

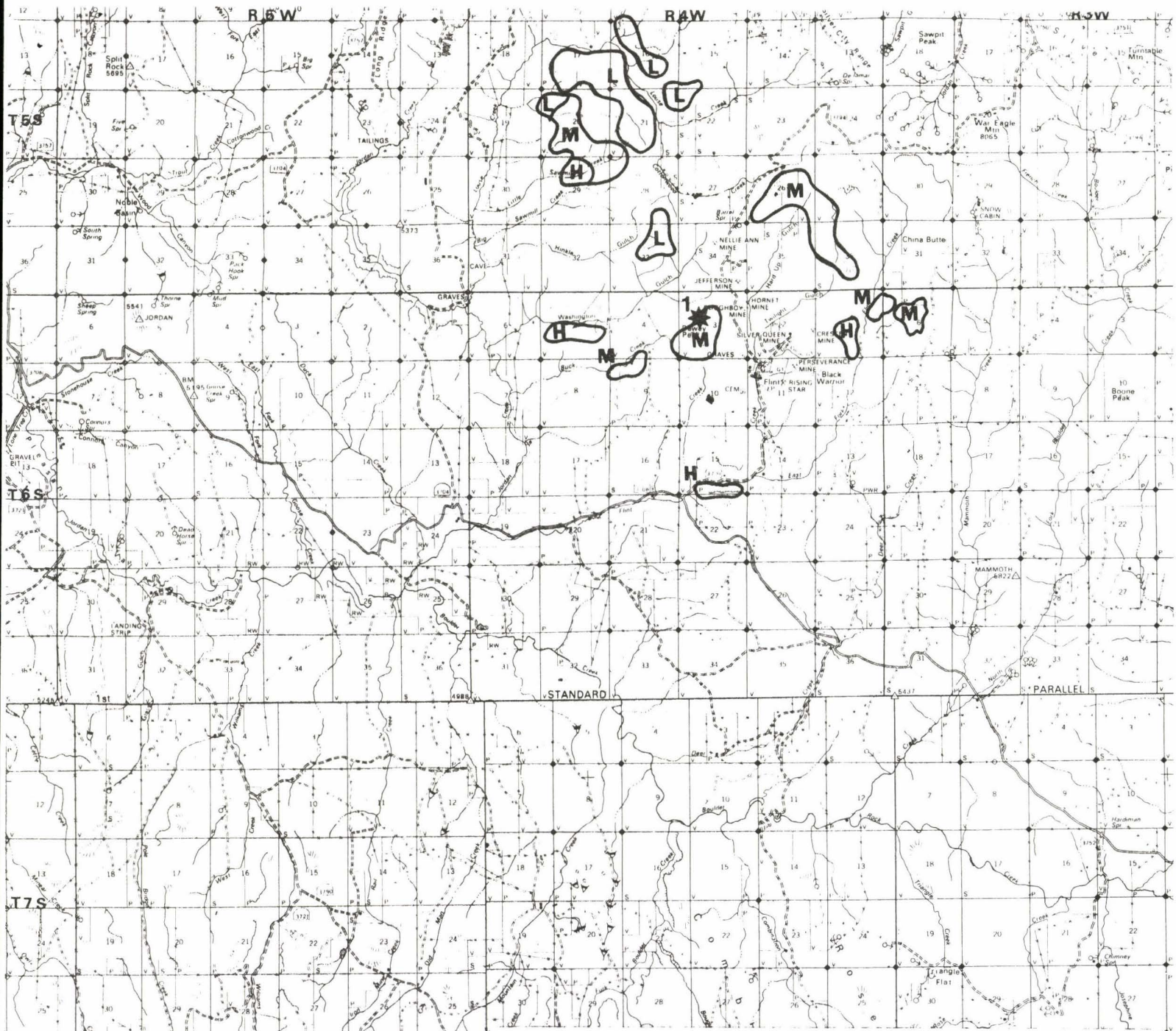

Figure 1. Douglas-fir tussock moth - Owyhee Mountains 1982. Areas of defoliation and larval evaluation sites.

- area of defoliation

H- heavy defoliation
M- moderate defoliation
L- light defoliation

- larval evaluation site
  1 - Dewey Peak
  2 - Mill Creek

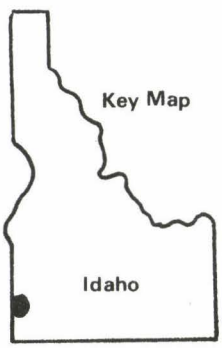

Figure 2. Douglas-fir tussock moth early detection survey sites (✱) in southern Idaho, 1982.

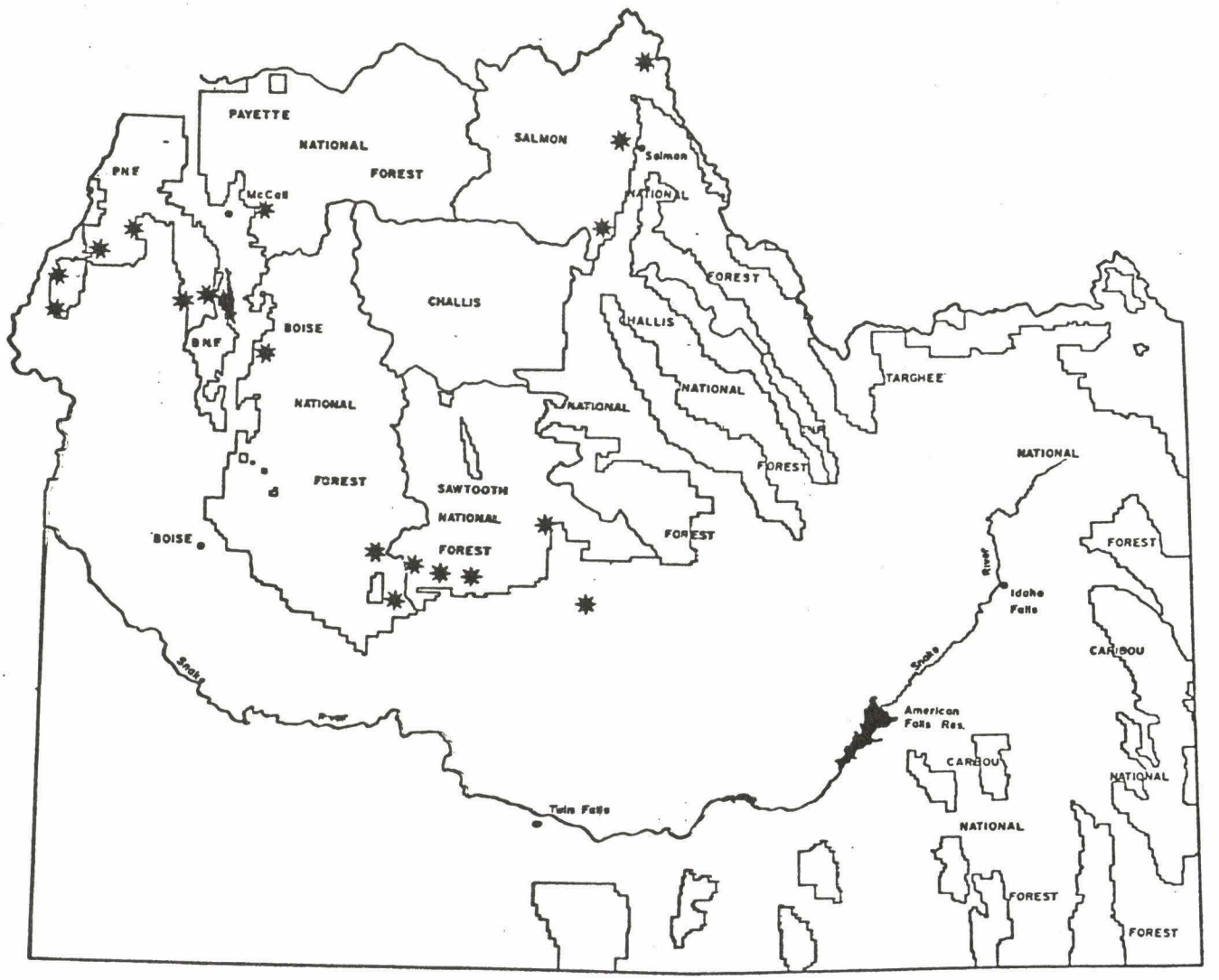

Table 1.--Summary of male Douglas-fir tussock moths caught in pheromone-baited traps distributed in southern Idaho - 1982

Plot	Location Twp.	Rge.	Sec.	Mean Number of Male Douglas-fir Tussock Moths/Trap by Year 1981	1982
Boise NF					
Anderson Creek Divide	14N	2E	14	1.2	0
Bear Creek	4N	10E	7	NS[1]	0
Skunk Creek	12N	4E	14	0.2	0.6
Yellow Pine Creek	3N	10E	35	NS	0
Payette NF					
Adams Creek	14N	6W	23	NS	53.6
Bear Saddle	15N	5W	31	NS	15.2
Brown's Pond	18N	4E	3	0	0.6
East Fork Brownlee Creek	16N	4W	3	NS	61.2
Fourbit Creek	13N	2E	7	NS	49.8
Olive Creek	17N	2W	7	NS	36.8
Salmon NF					
Arnette Creek	22N	20E	30	NS	0
Colson Creek	23N	16E	12	NS	15.2
Lick Creek	26N	22E	32	NS	7.6
Porphyry Creek	20N	18E	34	NS	0
Sawtooth NF					
Couch Summit	2N	14E	9	0.4	0
Little Water Gulch	3N	12E	7	3.8	13.6
Virginia Gulch	3N	11E	9	0.6	2.0
Warm Springs	4N	17E	14	NS	2.6
Idaho State Lands					
Sharps Canyon	2N	19E	36	19.4	16.2

[1] NS - not sampled

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